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Stephan Bolz

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EXAMINER

KITOV, ZEEV V

ART UNIT

PAPER NUMBER

2836

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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3 MONTHS

03/08/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

DETAILED ACTION

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 12, 16 - 19 are rejected under 35 U.S.C. 101 because the disclosed invention are inoperative and therefore lack utility. The disclosed invention is inoperative to achieve a stated purpose of determining a power loss across the switch. A function recited in Claims 11 and 14, i.e. to make sure that a power loss across the semiconductor circuit breaker does not exceed a predetermined value cannot be achieved the way disclosed in Claims 12 and 16 - 19. A reason for that is in the formula for calculation of an instantaneous value of a power loss across a switching element P_{ist} . According to Claim 12 formula, Applicant determines an instantaneous value of a current by differentiating an instantaneous value of a voltage drop across a semiconductor switch. In the process illustrated in Fig. 3, a capacitor is charged through the semiconductor switch (Q1, Q2), which at any moment is nothing but a resistive element. Such case is widely known and discussed, for example by Horowitz et al., The Art of Electronics (page 23). It is true that the current in this case is determined as a derivative of the voltage (see a formula at the bottom of page 23), but it is the voltage across the capacitor and by no means, a potential difference across the resistive element, the semiconductor switch, as Applicant suggests. The instantaneous value of current is directly proportional to the voltage drop across the semiconductor switch, and

Art Unit: 2836

differentiation of so-called differential voltage provides results, which has nothing to do with the value of the current. It is just a speed of a voltage change across the semiconductor switch. The term differential voltage is probably confusing enough inviting association with derivative and differentiation, but it is only a value of potential difference across the semiconductor switch. Examiner considers the formula of Claim 12 and the way of functioning of the structure of Claims 16 - 19 according to the formula being erroneous. While regulating the power loss across the semiconductor switch is quite reasonable and may be achieved, the method of Claim 12 and the way of functioning of the structure of Claims 16 - 19 according to the formula provide wrong criteria for such regulation.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claim 20 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter, which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. A reason for that is that the claim discloses the structure of a controller receiving the differential voltage and computing a control signal (controlled variable). According to Specification [0048], the control signal value is calculated by differentiating the potential

Art Unit: 2836

difference voltage measured across the transistor switch and as was stated above (see 35 U.S.C. 101 rejection), does not represent the power across the switching transistor. Therefore, Specification does not disclose the way the structure disclosed by the claim can operate. With Specification disclosing an erroneous way of the circuit functioning one of ordinary skill in the art would not be able to reproduce and practice the system.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

Claim 12 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. A reason for that is in a following claim limitation: "determining a differential of the absolute value of the differential voltage over time according to the formula ...", while the following formula discloses determination of the power loss.

Specification

The disclosure is objected to because of the following informalities: In [0011, 0012 and 0017] Applicant describes his invention by making reference to the claims, which is inappropriate way of disclosing the invention. Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claim 11 is rejected under 35 U.S.C. 102(e) as being anticipated by Hausman et al. (US 6,347,028). Regarding Claim 11, Hausman et al. disclose following: controlling a resistance of the semiconductor circuit breaker by a control voltage such that a power loss from the semiconductor circuit breaker does not exceed a predetermined set point (col. 9, line 9 - col. 10, line 41).

Regarding Claim 13, Hausman et al. disclose determining by using a differential voltage tapped from between connection terminals of the semiconductor circuit breaker (26 in Fig. 8A); an absolute value of the differential voltage is obtained due to use of diodes (D1, D2 in Fig. 8B) and compared to a reference potential (voltage at pin 11 of comparator r42 in Fig. 8B); determining and storing the absolute value of the differential voltage (across capacitor C2 in Fig. 8B); the switch conducts AC current and being controlled by the time-variable voltage (at output of comparator 24 in Fig. 8A) as a command variable for regulating the absolute value of the differential voltage for the process of reversing the charge (current) flow; as to a process of reversing the charge (current) flow, it is inherent in the concept of switching polarity of the current

Art Unit: 2836

flowing through the semiconductor switch that it starts with the absolute value of the differential voltage at a start of the process of reversing the charge up to a point in time when the process of reversing the charge has ended and the absolute value of the differential voltage = 0V, resulting in a controlled variable serving as a control signal for generating the control voltage (zero crossing detector 16 in Fig. 2, col. 7, lines 13 - 16).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 14, 15 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hausman et al. in view of Dawes (US 5,640,293) and Iverson et al. (US 6,828,755). Claim 14 differs from Claim 11 rejected above by its limitation of having a charge pump. Dawes et al. disclose the charge pump (36 in Fig. 4) generating a control voltage and connected to the gate drive of the switching transistor in output circuit (42 in Fig. 3, col. 3, lines 30 – 59). The reference has the same problem solving area, namely providing semiconductor switch for high current high voltage switching protected against excessive power dissipation. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the Hausman et al. solution by adding the charge pump according to teachings of Dawes et al., because as Dawes et al. state (col. 3, lines 30 – 33), the charge pump is necessary to cause saturation of the

filed effect transistor used in the output circuit. As well known in the art, a control signal to effectively control the semiconductor switch its gate voltage must have a bias bringing the gate voltage to a value higher than source voltage of the transistor; in such case a voltage higher than the normal power supply value is necessary.

Additionally, Hausman et al. does not disclose a circuit breaker disposed between two energy storage elements in a vehicle. Iverson et al. disclose circuit breakers (60 in Fig. 4A, 62b, 62a, 140a, 140b in Fig. 4B) disposed between the storage devices (36 and 38 in Fig. 4B) in a wiring system of a vehicle equipped with an integrated starter generator (col. 7, lines 56 – 66). The reference is pertinent to the case since it discloses the circuit breakers disposed between the storage devices in a wiring system of a vehicle equipped with an integrated starter generator. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the Hausman et al. solution by integrating the switching solution of Hausman et al. into the vehicle environment according to teachings of Iverson et al. because (I) Iverson et al. disclose that the switches may be of MOSFET type (col. 7, lines 48 – 52), and therefore according to Hausman et al., they will need protection against power dissipation, (II) and such application will expand the marketing niche for manufacturers of the Hausman et al. system.

Regarding Claim 15 it further discloses two semiconductors connected in series and having interconnecting gate connection and interconnected source connections (Q1, Q2 in Fig. 8A), the transistors may be shifted by an external control signal to a conductive state by an additional transistor, which is an output transistor of the

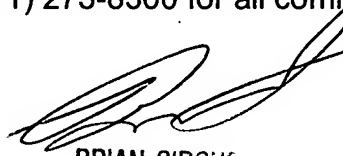
Art Unit: 2836

comparator (LM2903 in Fig. 8A), which inherently present in the output of the comparator circuit (Q16 in Fig. 1 in LM2903 Data Sheet).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Zeev Kitov whose current telephone number is (571) 272 - 2052. The examiner can normally be reached on 8:00 – 4:30. If attempts to reach examiner by telephone are unsuccessful, the examiner's supervisor, Brian Sircus can be reached on (571) 272 – 2800, Ext. 36. The fax phone number for organization where this application or proceedings is assigned is (571) 273-8300 for all communications.

Z.K.
2/26/2007



BRIAN SIRCUS
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER

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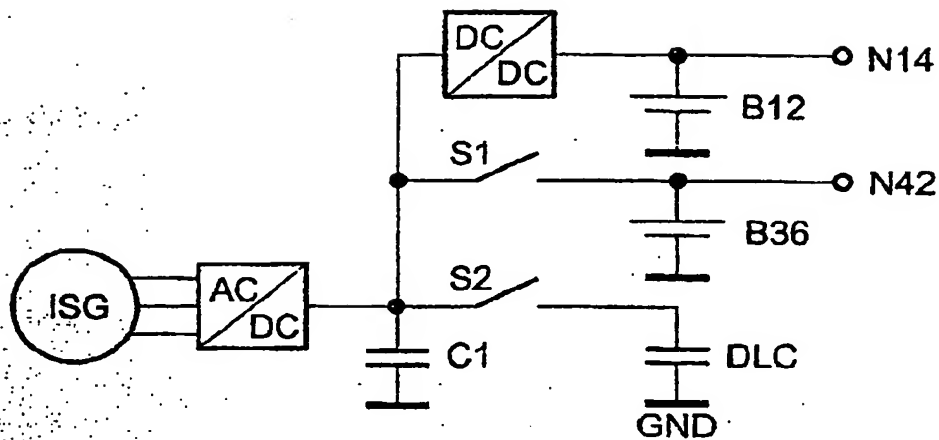


Fig 1

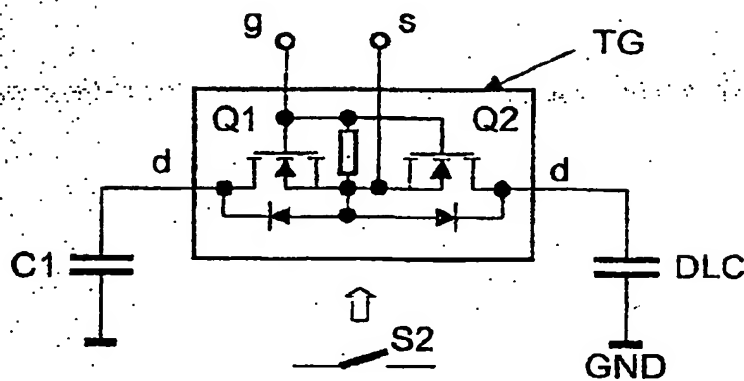


Fig 2

Object. Rectifier K1 is not shown.

3/4
rectifier

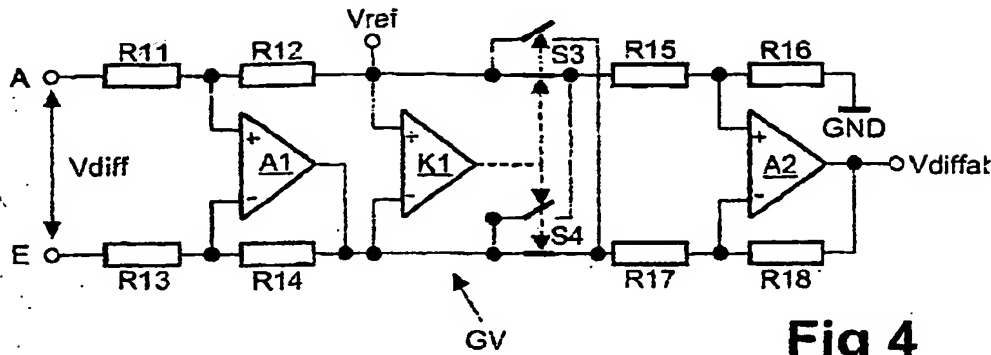


Fig 4

Abs. value

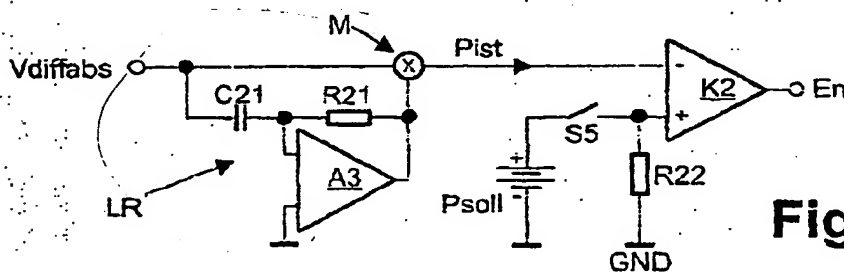


Fig 5

calculate
pwr of
switch

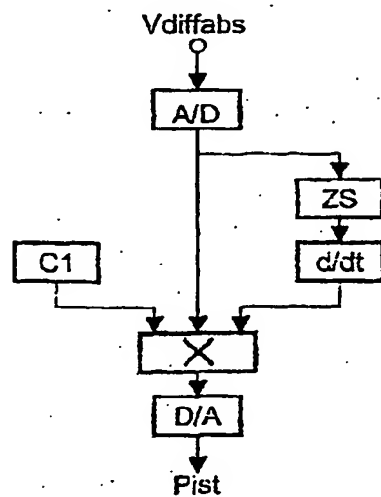


Fig 6

4/4

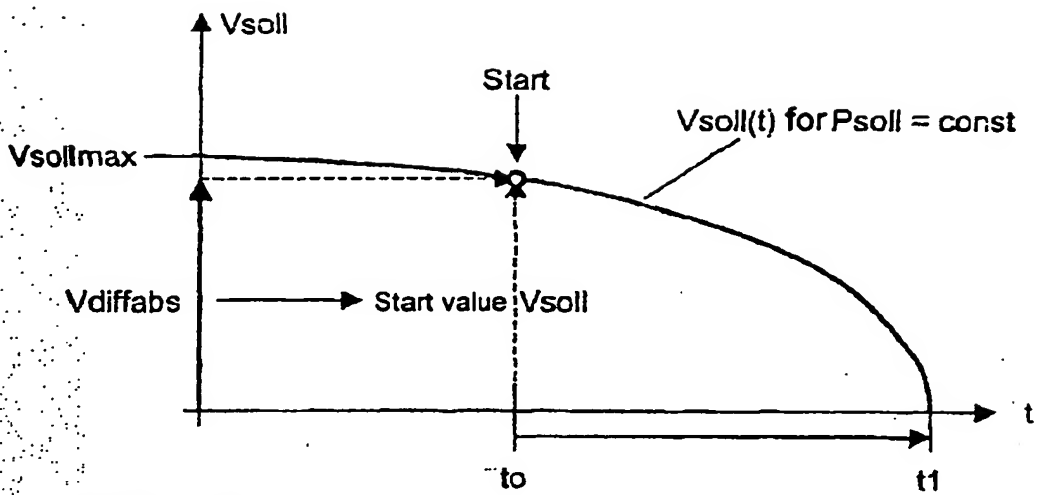


Fig 7

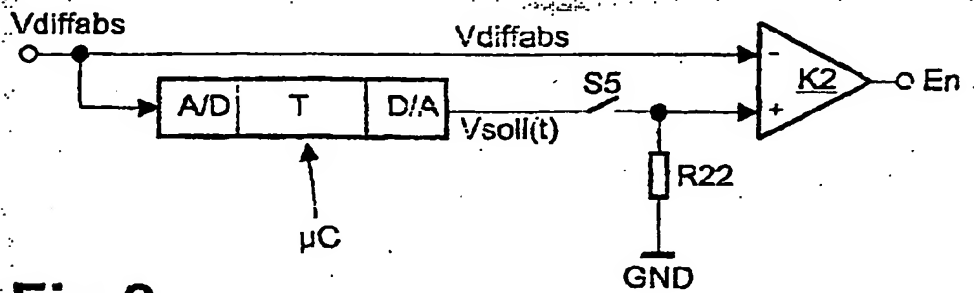


Fig 8